

Remarks

The present application has claims 1, 2, 4-6, 8 and 11-21 pending. Claims 11-19 have been withdrawn from consideration in the present application, but not yet canceled. Applicants have not made any amendments to the claims in the present response.

In the June 6th Office Action, the Examiner rejected all the pending claims under 35 USC §103 as obvious over Starz, et al. (USP 6,500,217) in view of Yano (USP 5,380,806) and Tsai, et al. (USP 6,514,296) and Yoshino, et al. (US Pub. No. 2002/0048654 A1).

Applicants respectfully disagree with the Examiner's position. Initially, Applicants wish to point out that the reference Starz, et al. '217 is not a proper prior art reference against the present application. The Starz, et al. reference was published as US Patent No. 6,500,217 on December 31, 2002. The present application claims priority under 35 USC §119 to a European application filed July 31, 2002 -- that is, prior to the publication of Starz, et al. reference. Accordingly, the Starz et al. reference can only qualify as prior art under 35 USC §102(e). Under 35 USC §103(c), such a reference may be disqualified as prior art if owned by the same entity as that of the subject application at the time the claimed invention was made.

Applicants hereby advises the Examiner that the present application and the Starz, et al. reference were, at the time the present invention was made, owned by, or subject to an obligation of assignment to, the same entity -- Umicore AG & Co. KG.

In addition to disqualification under 35 USC §103(c), the Starz, et al. reference is distinguishable from the presently claimed invention. In a prior amendment, Applicants restricted the claimed invention to water-based catalyst inks comprising an

electrocatalyst, an ionomer, water and a surfactant with a vapor pressure between 1 and 600 Pascal in a particular weight percent range, 0.1 to 20 wt. %.

In the June 6th Office Action, the Examiner addresses the weight percentage requirement for the surfactant, but not the requirement that the surfactant have a vapor pressure between 1 and 600 Pascal.

As pointed out in the specification of the present application (on page 7, lines 3-13), the vapor pressure requirement is important for the quality of the electrode layers. See page 7, lines 3-13:

In a second embodiment, the present invention uses improved water-based catalyst inks to coat substrates. These water-based catalyst ink compositions comprise an electrocatalyst, an ionomer resin, water (as a main solvent) and a surfactant with a vapor pressure in the range of 1 to 600 Pascal (Pa) at room temperature (20-25°C). The surfactants improve the wetting and leveling characteristics of the ink, particularly to hydrophobic substrate materials, such as polymer films or PTFE-impregnated backings. The high vapor pressure facilitates the removal of the surfactants after the leveling process when exposed to slightly elevated temperatures in the drying stage. As a consequence, less surfactant remains in the printed electrode layers; this in turn leads to an improvement in electrical performance of the electrode layers, and consequently, of the MEAs manufactured with these inks.

(emphasis added)

The specific range of vapor pressure is necessary to obtain complete removal of the surfactant during the drying step. As a result, the practice of the presently claimed invention leaves less surfactant in the electrode layers. Accordingly, the catalytic centers in the layers are less blocked – providing better electrical performance (see page 7, line 11-13). Conventional surfactants are high boiling, with low vapor pressure - in general, below 1 Pascal - and are adsorbed to the catalytic centers of the electrocatalyst, thereby blocking the access of the reactants to the catalyst surface.

With respect to the cited references, the Starz, et al. reference does not disclose or suggest an ink comprising a surfactant either in the weight percentage range specified in claim 1 or having the required vapor pressure of claim 1. The teachings of secondary references Yano; Tsai, et al. and Yoshino, et al. do not remedy the shortcomings of Starz, et al.

Yano does not teach catalyst inks having surfactants with vapor pressures in the range set forth in amended claim 1 or present in the amounts required by amended claim 1. Likewise, the Tsai, et al. reference does not contain any teaching regarding the use of a surfactant having a vapor pressure in the range set forth in claim 1, or being present in the amounts specified in claim 1.

With respect to the Yoshino, et al. reference, even if the Examiner is correct that this reference discloses the use of a surfactant in the weight percentage range of claim 1, there is no teaching in the reference that the surfactant have a vapor pressure between 1 and 600 Pascal, as set forth in claim 1.

Moreover, the combining of four references to reject the presently claimed invention is done with the use of hindsight, and hence improper. There is no motivation or suggestion in Starz, et al. or in any of the secondary references which would lead a person of ordinary skill in the art to modify the inks or processes of Starz, et al. in the manner proposed by the Examiner.

In view of the foregoing the remarks, reconsideration of the rejection under 35 USC §103 and allowance of the application are respectfully requested.


No fee is deemed due with respect to the filing of the present response, other than the fee for the requested three month extension of time and the fee for the accompanying RCE, which Applicants are concurrently filing with the present response. If any

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additional fees are due, or an overpayment has been made, please charge, or credit, our
Deposit Account No. 11-0171 for such sum.

If the Examiner has any questions regarding the present application, the Examiner
is cordially invited to contact Applicants' attorney at the telephone number provided
below.

Respectfully submitted,

A handwritten signature in black ink, reading "John J. Santalone". The signature is written in a cursive style with a horizontal line underneath the name.

John J. Santalone
Registration No.: 32,794
Attorney for Applicants

Kalow & Springut LLP
(212) 813-1600